SMART GRIDS IN DISTRIBUTION NETWORKS:
Expert workshop in support of deployment and integration in Mexico

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WORKSHOP HIGHLIGHTS AND CONSIDERATIONS MOVING FORWARD

This workshop was organised by the IEA under the International Low-Carbon Energy Technology Platform and the Ministry of Energy of Mexico (Secretaria de Energia - SENER) in collaboration with the Fondo de Sustenabilidad Energética. The overarching objective of the workshop was to support the Mexican government in its continued efforts to smarten the electricity distribution system, with a view to accelerate the transition to a clean and advanced power system. To accomplish this objective, the workshop focused on: (i) examining existing barriers or issues to smart grid technology deployment, (ii) engaging relevant stakeholders in discussions on policy and investment opportunities and (iii) identifying response actions that foster next steps towards energy innovation in Mexico.

The workshop sought to connect a diverse range of international and national experts within public and private sectors to support wider collaborations necessary for coordinated smart grid deployment. The international presence brought perspectives of successful smart grid deployment, with particularly comparative and poignant examples in Italy and the United States, as well as recommendations for steps that Mexico could take to move forward with a smooth deployment process. The 2015 edition of the IEA Energy Technology Perspectives was presented to highlight technologies' role in the decarbonisation of the energy sector and how support for innovation can drive this transition. The IEA How2Guide for Smart Grids in Distribution Networks was presented as a strategic framework to guide stakeholders through the process of successfully implementing a smart grid roadmap and ultimately meeting intended goals set at national or regional levels.

Several considerations for smart grids in Mexico from regulatory and technical perspectives were formulated by national stakeholders at the workshop, illuminating a set of priorities for concerted effort for smart grid deployment. The following list provides an overview of these priorities.

- Location-specific solutions and technologies that address regional issues in the Mexican electricity system need to be considered by the national smart grid strategy (e.g. some pilot studies in Mexico showed that consumers did not use the interactive website to view consumption patterns; therefore the approach should be adapted in the future to engage customers differently).
- Establishing co-ordination among key parties (e.g. policy makers, regulatory authorities, utilities, research institutions, academia, private sector, etc.) is essential for defining the scope of smart grids, as well as enabling streamlined implementation. First and foremost, this should include integrating the separate roadmapping activities and approaches being undertaken by Mexican agencies.
- Reduction of technical and non-technical line losses is a key driver of smart grid technology deployment.
- Significantly increasing renewable energy penetration and system flexibility is required to meet 2020 targets, ranking as another top driver of smart grid technology deployment.
- Smart grids can be utilised as a competitive advantage for Mexico, as a method of both reducing costs and increasing investments.

- End-user considerations have cross-cutting implications for technology deployment (e.g. customer satisfaction, providing direct access to knowledge of self-consumption and reliable service) and are factors that need to be at the forefront of all phases of smart grid strategising and implementation.
- Obtain and analyse enough data to make well-informed decisions that feed into immediate plans and action.
- Re-educate customers and re-train the national workforce taking into account fast-paced advancement of smart grid technologies.

Considering Mexico's national situation, priorities, drivers and expert recommendations, there are certain technologies that could be highly beneficial in accomplishing goals of smart grid deployment. Many of these technologies address more than one priority or driver as a primary outcome of a project. Table 1 (below) links drivers with smart grid project types and categorises outcomes as primary, secondary or addressing a driver to some degree. Technical and non-technical line losses can be better managed and thus significantly reduced by technologies such as advanced metering infrastructure (AMI), distribution and substation automation, control centre systems, information communication technologies (ICT) and demand-side management such as demand response. To enable higher penetration of renewable energy and increase electricity system flexibility, technologies including AMI, distribution automation, control centre systems, demand response and distributed generation can address these drivers as primary outcomes of deployment.

Table 1 • Selection of smart grid project types linked to drivers

Project type	Advanced Metering Infrastructure	Distribution Automation	Control Center Systems	Customer Side Systems	DER - Storage	DER - Distributed generation	DER - Demand response	Substation Automation	Asset Management
Driver									
Reliability									
Reliability improvements									
Power quality improvements									
Power restoration improvements									
Network adequacy									
Generation adequacy									
Efficiency									
System efficiency improvements (reduction in peak load, T&D losses, etc.)									
Optimizing asset utilization									
Energy efficiency improvements									
Enabling new products, services, and markets									
Enabling customer choice and participation									
Economic									
Economic advantages									
New revenues									
Revenue collection and assurance improvements									
Reducing operating and maintenance costs									
Environmental									
Renewable energy standards or targets									
Reduce carbon footprint									
Regulatory compliance									
Renewables									
Security									
National security concerns									
Enhanced power system resiliency to natural and human threats									
Safety									
Safety improvements									
Crosscutting									
Aging infrastructure concerns									
Rural electrification									
Job creation									
Increased flexibility									
Shifting ownership structures									
Consumer involvement									

Can address driver as a primary outcome of the project	
Can address driver as a secondary outcome of the project	
Can address driver to a small degree as a project outcome	

Source: IEA (2015), *How2Guide for Smart Grids in Distribution Networks*, OECD/IEA, Paris.

A key factor for the Center that should be cross-cutting for all works streams is ensuring that the smart grid deployment strategy fits with the **wider contexts** of the National Energy Strategy, as well as environmental and economic development strategies. Smart grids can provide an infrastructural basis for integrative, holistic planning, and should not be deployed as a piecemeal approach, but rather can serve to link various thematic strategies. Utilising smart grids to help meet wider goals can set Mexico ahead with competitive advantage, particularly as the Mexican population is increasingly moving to urban areas. Smart grid technologies can help manage this geographical shift and connect supply and demand through more efficient, clean, reliable and flexible electricity systems.